RECHERCHE

Development of Physical Standards for Admission to Police-type Jobs (Synthesis of three studies)

Gouvernement du Québec
Office des ressources humaines

RECHERCHE

Development of Physical Standards for Admission to Police-type Jobs (Synthesis of three studies)

Louis Cimon
Direction générale de la
recherche et de la planification

Office des ressources humaines

Québec City, December 1987

89-05031/

The RECHERCHE series is the vehicle chosen by the Office des ressources humaines for publishing the results of research carried out on the management of human resources in the Québec public service.

The persons who receive this publication are invited to pass it along in their units.

Legal deposit - Fourth quarter 1987
Bibliothèque nationale du Québec
ISBN: 2-550-18029-1
ISSN: 0832-9664

Summary

This document is a condensation of three studies[1] on the development of physical standards for admission to the peace officer job category in the provincial public service, and to the provincial and municipal police job categories. Since these standards must be closely related to the tasks involved, job analyses were carried out. These analyses began with a questionnaire which was completed by 579 officers (peace officers and police constables)[2]. Next, 56 officers were observed in their working environment. Examination of the results provided the necessary information to develop a series of tests which were administered to 58 officers and 56 people who represented potential candidates. The process resulted in a series of recommendations regarding the application of the tests, and produced minimum standards which would become the new physical standards for admission to the various police-type job categories.

---

(1) BARD, Chantal, FLEURY, Michelle, JOBIN, Jean, LAGASSÉ, Pierre and Benoît ROY, ***Élaboration des normes physiques d'admission aux corps d'agents de la paix***, Département d'éducation physique, Université Laval, 1985.

CIMON, Louis, ***Inventaire des activités physiques afférentes au travail des agents et agentes de la paix de la fonction publique***, Gouvernement du Québec, Office des ressources humaines, 1985.

GENDRON, Raynald, ***Révision des "normes d'embauche des agents et cadets de la Sûreté du Québec et des corps de police municipaux"***, Gouvernement du Québec, Commission de police du Québec, 1984.

(2) Our thanks to the public service peace officers and the police constables who participated in this project and the unions and management personnel who encouraged them in their endeavours. Special thanks must go to Mr. Raynald Gendron, Research Director at the Commission de police, for his involvement in the police aspect of the project.

Introduction

In Québec, a person who wants to become a police constable must meet the medical requirements defined under the ***By-law respecting standards of the Sûreté du Québec and municipal police forces for the hiring of constables and cadets***[1]. In addition, most peace officers of the Québec public service must comply with those same standards, as required by the classification directives of the Conseil du Trésor, except as regards height and weight.

In revising its hiring standards, the Commission de police, in cooperation with the Office des ressources humaines, developed criteria for the physical skills required of peace officers and police constables in their work.

The resulting criteria became hiring standards on November 26, 1986, when ***the By-law respecting standards of the Sûreté du Québec and municipal police forces for the hiring of constables and cadets (amendment)***[2] came into force.

The following text briefly describes the method used, the tests developed and the standards proposed.

---

(1) RRQ 1981, chap. P-13, r. 14

(2) (1986) 118 G.O. 2, 2689

Job analysis

Determination of adequate hiring standards as regards physical skills must be based on a detailed job analysis. In this case, the literature available and our discussions with the officers revealed that the job seldom involved major physical efforts, but when it did, those efforts could be vital.

The job analysis questionnaire was developed following meetings with groups of security officers, fishery officers, bodyguard-chauffeurs, Youth Court officers and wildlife conservation officers, as well as groups of municipal police force constables and of constables of the Sûreté du Québec. Representatives of the ministère de la Justice described the activities of detention institution instructors, monitors and nursing technicians. The information gathered from these 46 people representing various groups of officers was useful to the preparation of a job analysis questionnaire. This questionnaire was divided into four sections:

- a description of the research project objective;
- a general description of the respondent (age, height, weight, etc.);
- questions on work accidents;
- questions on the physical tasks carried out by the officers from the beginning of their career as peace officers.

The questionnaire was distributed to 397 peace officers and 473 constables.

The information in the 579 questionnaires returned was synthesized[1] and was used as a starting point for the team of human motor performance measurement specialists from the Université Laval, whose mandate under their contract with the Office des ressources humaines was to develop physical standards for admission to the peace officer and police constable job categories.

In order to complete the data collected by means of the questionnaires, the research team conducted job analyses in a work context[2]. For one full workday, members of the team observed and noted the main physical activities of each officer under observation. The duration and frequency of those activities were also recorded. Researchers used a portable electrocardiograph to record the heart rate of each subject, in order to determine the energy cost index of each task.

Eleven municipal police constables, eleven Sûreté du Québec constables, two fishery officers, twelve detention institution monitors, five detention institution nursing technicians, three security officers, nine wildlife conservation officers and three bodyguard-chauffeurs were put under observation for one full workday, or a total of 456 hours of observation.

The activities inventoried by means of the questionnaire and those gathered by observation in the field were divided into groups according to their similarities (ex.: pushing a stretcher on wheels and pushing a cart).

The researchers then determined the muscular, organic and perceptual motor[3] skill requirements and energy cost for each group of activities and for each job category; they also determined the relative importance of each of those requirements. They then developed tests demanding the same type and intensity of muscular, organic and perceptual motor skill requirements, and energy cost, as those needed by the officers in their work.

Description of the tests

Nine simple tests were selected, similar in terms of muscular, organic, perceptual motor skill and energy requirements to those needed for the tasks analyzed in the officers' work context and inventoried in the questionnaire.

---

(1) This synthesis appears in two reports:
CIMON, Louis, ***Inventaire des activités afférentes au travail des agents et des agentes de la paix de la fonction publique.*** Gouvernement du Québec, Office des ressources humaines, 1985.

GENDRON, Raynald, ***Révision des "normes d'embauche des agents et cadets de la Sûreté du Québec et des corps de police municipaux".*** Gouvernement du Québec, Commission de police du Québec, 1984.

(2) The results of these analyses and a detailed description of the development of the physical standards are presented in:
BARD, Chantal, FLEURY, Michelle, JOBIN, Jean, LAGASSÉ, Pierre and Benoît ROY, ***Élaboration des normes physiques d'admission aux corps d'agents de la paix.*** Département d'éducation physique, Université Laval, 1985.

(3) Relative to the perception of movement.

The nine tests were closely integrated into a special circuit which demands an effort from the human machine while conforming, as much as possible, to a real work context. The circuit was the same for everyone undergoing the tests, regardless of sex, age, height, weight or physical handicap because the job analyses clearly showed that the tasks were the same for all officers who had to do them, no matter what their physical condition. Here are the nine tests included in the circuit:

1. Choice reaction time

At the start of the circuit, the candidate was submitted to a choice reaction time test. The subject stood with one foot resting on a switch connected to a digital clock counter (Figure 1). A curved panel supporting five lightbulbs was located two metres away from him.

When one of the lightbulbs lit up at random, the subject had to respond as quickly as possible, either by pressing the button located just below the bulb (his reaction time was then measured), or by starting on the circuit if the centre bulb lit up. The counter used to clock the total distance was then tripped. The subject was given no indication as to when the starting signal would be given; all he knew was that when the centre bulb lit up, he had to start on the circuit.

This test measures the quality and speed of the subject's decisional process. It represents the rapid decisions an officer has to make, especially when to begin pursuit of a suspect, whether in a squad car or on foot.

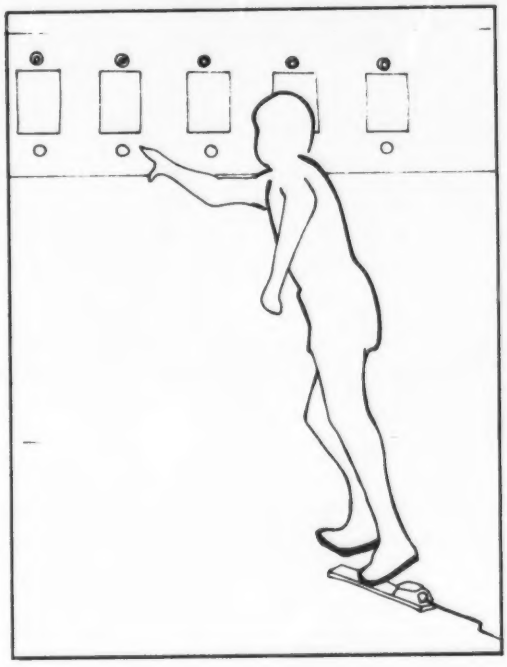


Figure 1 - Starting point and choice reaction time test.

2. Running

After the first test, the subject had to sprint a distance of 150 metres: three times around the gym.

The circuit included a total of 450 metres of running, interspersed with various tests. We will describe the various legs of the circuit and their specifications, as we describe how the circuit unfolded.

The running test was divided into a series of short sprints. The series required muscular and organic resistance, but when repeated, it also required organic endurance. These elements characterize the running activities often found in job analyses. In a work context, most running is done over a distance of approximately 50 metres, during which the officer has to round a corner, avoid a pedestrian or an obstacle.

This leg of the circuit reflects a type of motor activity which often occurs in the work of a peace officer or police constable.

3. Climbing and jumping

After the 150-metre sprint, the subject climbed five steps, went through a frame, jumped out on the other side (Figure 2), and continued on. The five steps measured the same as the average height of that type of jump recorded in the officers' tasks.

This activity demands muscular strength, organic resistance and balance. The climbing, jumping and crawling which appear in the analyses of the officers' regular tasks are the reasons this test was included in the course.

The subject then ran his fourth lap.

4. Balance beam

At the half-point of the fifth lap, the subject was required to walk or run on a 5-metre balance beam placed 30 centimetres above the floor (Figure 3). If he put his foot

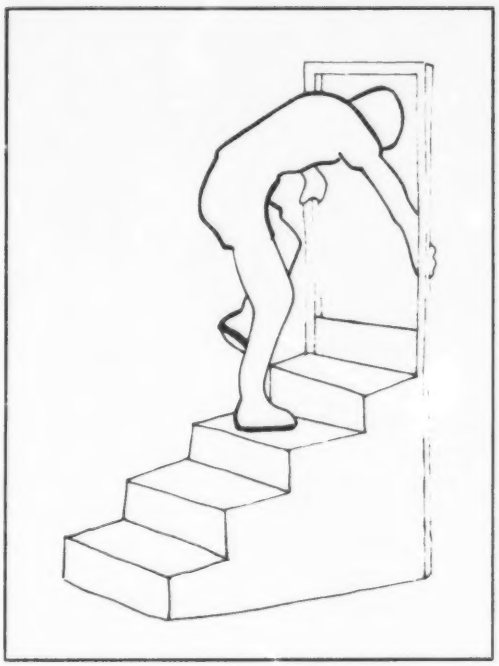


Figure 2 - Climbing going through frame and jumping

on the floor, he had to stay down, run back to the end of the beam and start over again. The ability to make a move requiring stability and balance is inherent in this activity. Once again, this test was based on the job analyses.

The subject then completed his fifth lap as quickly as possible.

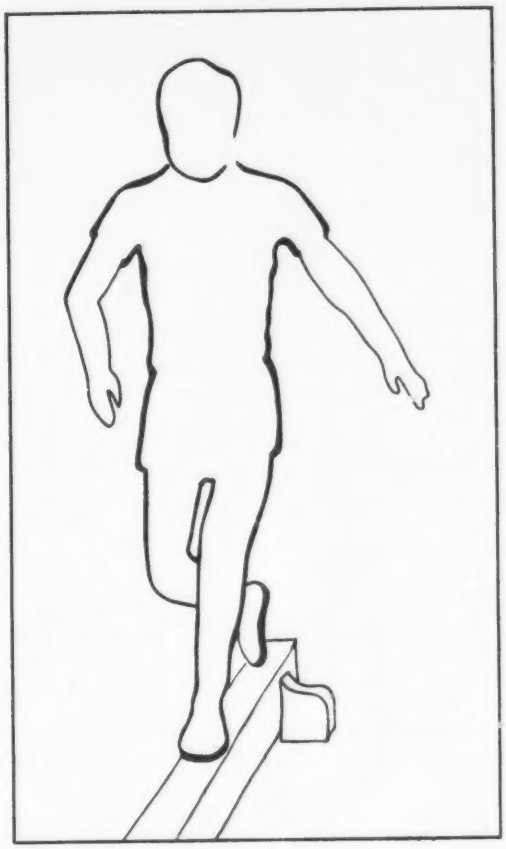


Figure 3 - Balancing on the beam

5. Slalom

Four obstacles were to be negotiated over a zig-zag course as quickly as possible (Figure 4). This test was included in the sixth lap.

It required the ability to quickly dodge around (balance) obstacles an officer may encounter in a pursuit.

It also involved reaction speed and the dodging movement necessary when patrolling on a snowmobile or all-terrain vehicle, for instance. This dodging activity is present in several tasks.

The sixth lap continued at top speed.

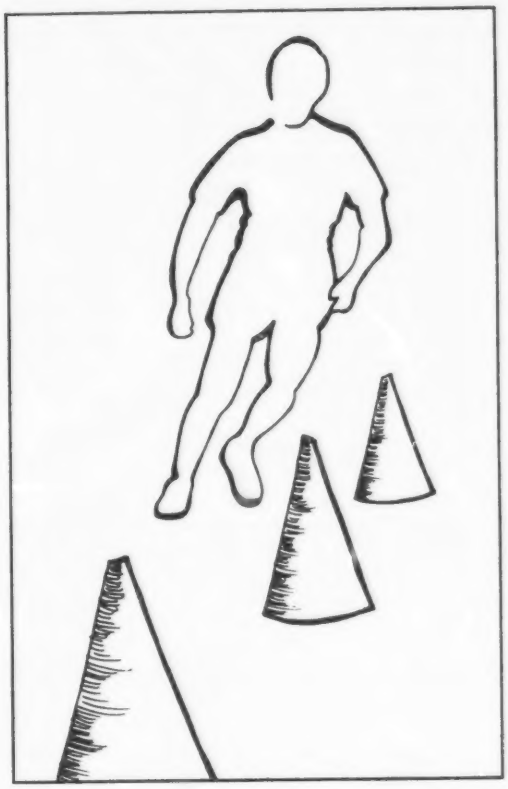


Figure 4 - Slalom

6. Overpowering an adversary

This activity was simulated during the seventh lap by having the subject go through precise motions on two separate pieces of equipment:

a) Simulation of turning someone around by flexing and extending the arms: rotating a piece of equipment (Figure 5) with a 68-kilogram resistance (average resistance by subjects being overpowered);

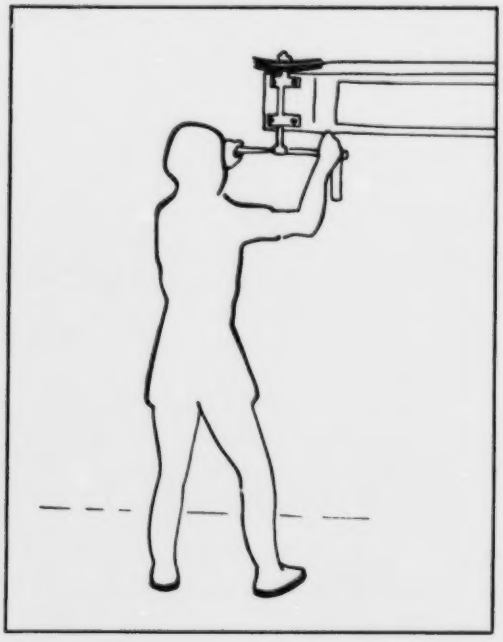


Figure 5 - Overpowering a person - rotation

b) Simulation of handcuffing someone: bringing closer together two metal rods with a resistance of approximately 23 kilograms (results of the biomechanical analysis of the average resistance of a person forced to put both arms behind his back) (Figure 6).

At the basis of this test is the skill necessary to rapidly execute precise and effective gestures. Its relation to a possible struggle to overpower a suspect is evident. It requires muscular strength and endurance, as well as organic resistance.

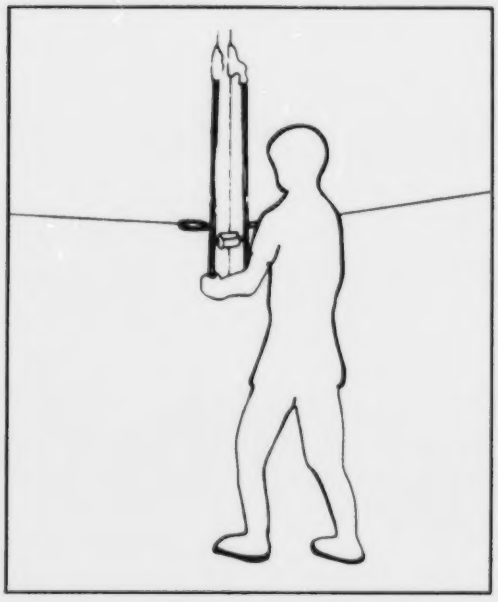


Figure 6 - Overpowering a person - handcuffing

7. Hauling

After running three quarters of the eighth lap, the subject had to haul a 75-kilogram bag 20 metres, then finish his lap as quickly as possible (Figure 7). This activity requires muscular and organic strength, resistance and endurance. Hauling or pulling an object or person is an activity which appears in the job analyses, more specifically in the inventory of the written documents on the matter.

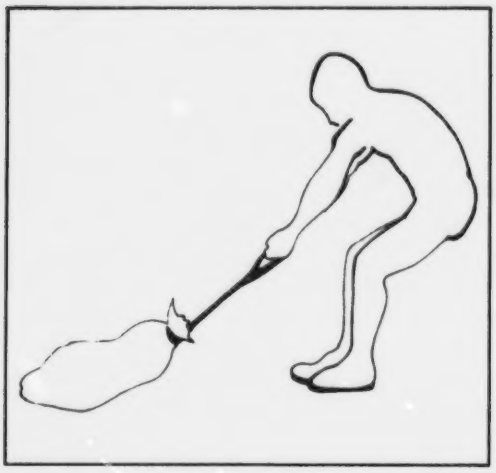


Figure 7 - Hauling

8. Post-vigilance reaction time

After completing his eighth lap, the subject stopped the digital clock counter by touching the wall at the end of the circuit. Then the subject's post-vigilance reaction time was measured after a ten-minute watch.

The subject sat at a table, in front of a lightbulb which would light up within the following ten minutes. When the light went on, the subject responded as quickly as possible by pressing a switch; his reaction time was then recorded. This test serves to evaluate a person's reaction speed after stress. It reflects the long periods of waiting and watching often found in a major part of the officers' work.

9. Stabilometer

The subject took up his position on the stabilometer: with one foot on each side of the pivot, he tried to hold his balance for 30 seconds (Figure 8). When the stabilometer was not in a horizontal position, a sound signal let the subject know. An examiner recorded the time during which balance was maintained. The ability to maintain balance appeared particularly important for officers required, for instance, to use a motorcycle, all-terrain vehicle, snowmobile or small boat in their work.

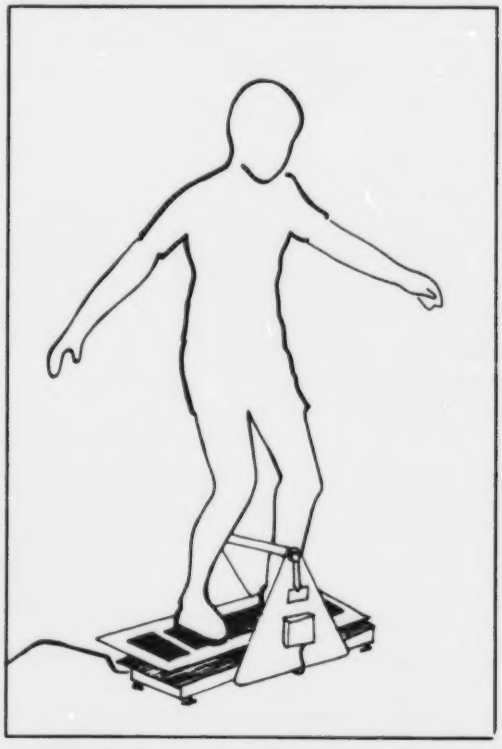
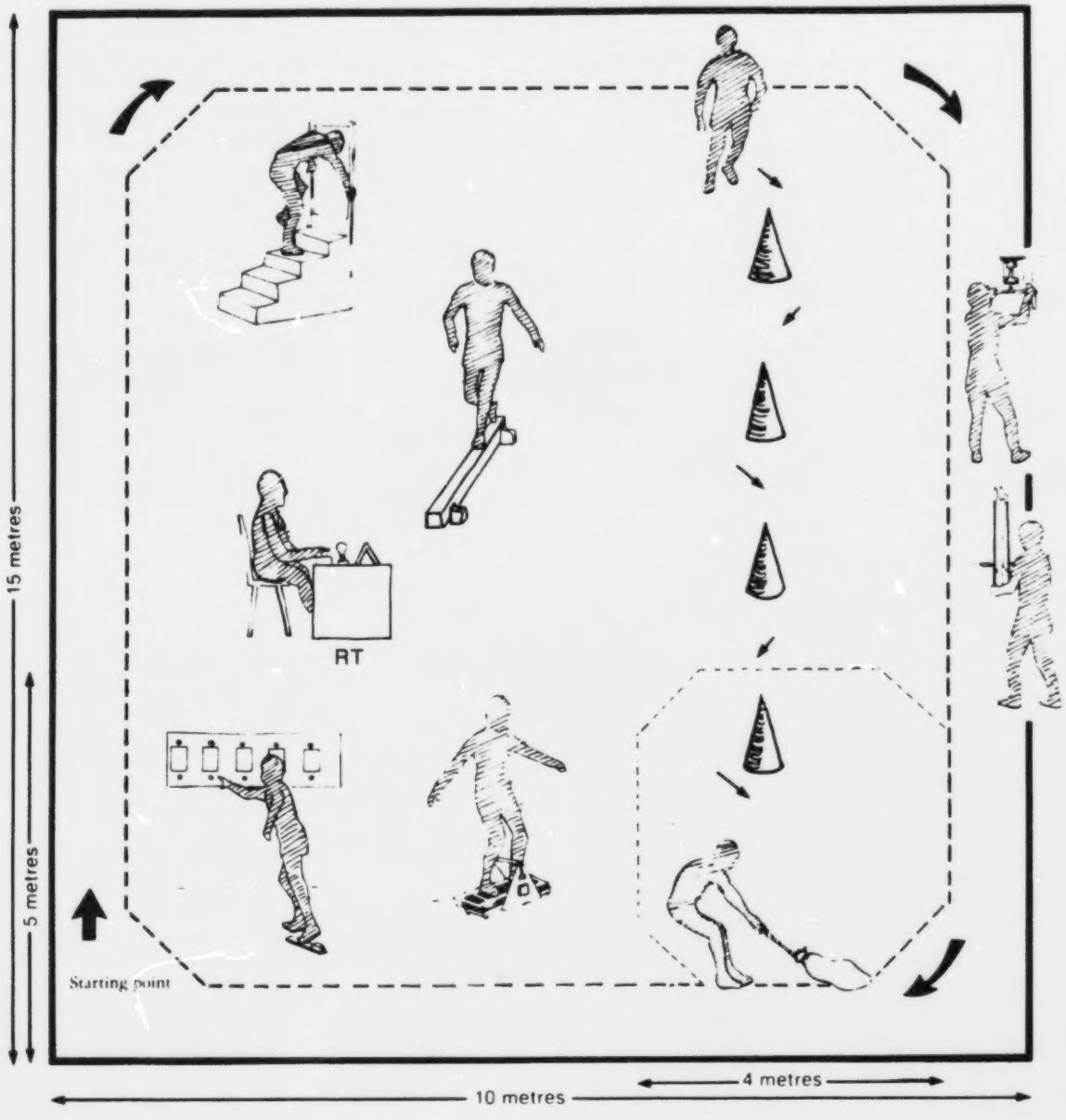


Figure 8 - Balancing on a stabilometer

Figure 9 shows a general layout of the test circuit.

Figure 9 - Layout of the circuit



Key:

	Slalom cone
RT	System to measure post-vigilance reaction time

Computing global test results

One hundred and fourteen subjects covered the circuit (56 people in a control group and 58 officers). Four measurements were recorded: the time it took each subject to complete the tests along the circuit; the choice reaction time; the post-vigilance reaction time; the time spent balancing on the stabilometer.

The importance of each of those four measurements in the calculation of the global results depends on the physical requirements the test relates to and the relative importance of each of those physical requirements in the person's job. The greater the importance of the physical requirements, the greater the importance of their measurement in calculating the global result. That is how the researchers came to recommend that the global score for fishery officers and wildlife conservation officers be calculated as follows:

59% of total circuit time[1]
\+ 11% of choice reaction time
16% of post-vigilance reaction time
14% of balancing time on the stabilometer
Global score

In the same manner, they recommended that the global score for candidates for other peace officer job categories included in this study be calculated as follows:

73% of total circuit time
\+ 11% of choice reaction time
16% of post-vigilance reaction time
Global score

This weighting of each test was validated when placed in relation with the relative frequencies of each quality observed in both the job analyses and the completed questionnaires.

In order to compare the performance of a group of active officers (able to perform the tasks required by their jobs but older than candidates for the jobs they hold) with that of potential candidates for such jobs, researchers recorded the following measurements:

- the test-circuit performance of nine bodyguard-chauffeurs, eleven detention institution monitors, seven detention institution nursing technicians, seven fishery officers, five wildlife conservation officers, eight Sûreté du Québec constables and eight municipal police constables;
- the performance of a control group composed of 56 men and women from 19 to 25 years of age.

Statistical analysis of the time spent balancing on the stabilometer supports the premise that only wildlife conservation officers and fishery officers really use this ability for balancing in their work. That is why this measurement is used to evaluate only candidates for the wildlife conservation officer and fishery officer job categories.

Moreover, the comparative analysis of the global results of the control group and the group of officers revealed that the group of

(1) In order to be able to add up the weighted results of each test, it was necessary to transform raw scores into T-scores. The average of this standardized scale is 50 and its standard deviation is 10.

officers behaved very similarly to the control group. The officers' ten-year age difference (in six groups out of seven) led to very few scores lower than those of the control groups. It is possible that those differences might have been caused in whole or in part by the fact that the control group members wore sportswear while the officers wore their work clothes, including, in some cases, a weapon, handcuffs and a two-way radio. But everyone wore running shoes.

It is interesting to note that one group of 10 underwent the whole test twice in 48 hours. This revealed that the results vary little[1] when subjects go over the circuit a second time.

Analysis of the statistics showed that there was no significant difference between the women's and the men's performances.

Passing score

On the basis of the results obtained both by the officers and by the control group, the researchers involved recommend that the passing score be half-way between the average score of the group fo officers and the average score of the control group. Consequently, if there were to be a single standard[2] for all job categories, approximately 74% of all candidates would be expected to pass the test.

Recommendations regarding the application of the test

The series of tests developed are relatively demanding physically. In order to prevent accidents during testing, every subject must meet the two following requirements:

1. Candidates must fill out a questionnaire on their abilities for physical activity.

   Answers must reveal no pathology, physical limitations or major cardiac risk factor.

2. People who qualify after answering the questionnaire must undergo an exercise test administered by a cardiologist or in a laboratory specialized in such evaluations.

   The results of this test must confirm that there is no evidence of ischemic heart disease[3] during a cardiac effort of at least 90% of the maximum heart rate estimate established for the subject's age group (for recruits between 20 and 30, 170 to 180 beats a minute).

   In the case of candidates presenting non-pathological physical limitations such as amputations, wearing of prostheses or ortheses, or other restrictions, testing may be allowed if the person's limitations do not endanger his health. As tests represent tasks to be accomplished, the researchers believe that the global score should be the only "physical" criterion of the candidate's capacity to do the work of a peace officer in general. No specifications as regards weight, height, etc. are required to undergo the test.

---

(1) $r = 0{,}83$.

(2) Suggested standard: a T-score of 47.

(3) Cardiac problem characterized by the death of heart tissue due to the obstruction of blood flow.

Conclusion

The analysis of the completed questionnaires, and the job analyses carried out in the field, made it possible to determine the muscular, organic and perceptual motor skill requirements necessary to do the job, and to develop a series of tests in relation to very specific criteria, such as:

- tests selected are similar to tasks the officers have to carry out in their work;

- tests selected correspond to the physical requirements identified in the job analysis, as regards both variety (all categories of requirements are considered) and relative weighting of each of them in relation to the whole series;

- there is no sexual discrimination in the series of tests;

- energy required to complete the circuit is such that the person who qualifies after the test seems to have the potential to face the physical realities of the job of officer without any great probability of a cardiovascular accident.

"Recherche" Series

1986, January	**Les cadres féminins et masculins retiennent-ils des comportements différents pour résoudre des problèmes de gestion,** by Jocelyn Poirier, Micheline Gamache, Michel Pépin and Yola Dubé
1986, September	**Le sondage en milieu de travail: un outil au service de la gestion et du personnel,** by Marie Poirier
1986, September	**Validité d'un centre d'évaluation pour identifier les futurs-es cadres au gouvernement du Québec,** by Gisèle Tourigny
1986, October	**Éléments de définitions: Les aspirations professionnelles, les valeurs, la motivation, les attitudes, la satisfaction au travail,** by Marie Poirier

Copies of "**Recherche**" are available from:

Direction de l'administration et des communications
Office des ressources humaines
1039, de la Chevrotière - 28e étage
Québec (Québec)
G1R 5E9
Tél.: 649-3313

Cette publication est également disponible en français.